

Talaczynska, A. et al. (2016). "Benefits and limitations of polymorphic and amorphous forms of active pharmaceutical ingredients." *Curr Pharm Des* 22(32):4975–4980.

Active pharmaceutical ingredients (APIs) can exist in different polymorphic forms as well as in amorphous state. Polymorphic and amorphous forms of APIs can differ in physicochemical properties which in turn can significantly influence their therapeutic safety and effectiveness of the treatment. This review focuses on benefits and limitations of polymorphic and amorphous forms of APIs used in preformulation and formulation studies. Authors present their work on safety precautions for the use of polymorphic and amorphous forms of APIs, analytical techniques used for their identification as well as methods of their preparation especially in regard to limitations of labile APIs.

Yalkowsky, S. H. and D. Alantary (2018). "Estimation of melting points of organics." *J Pharm Sci* 107(5):1211–1227.

Unified physicochemical property estimation relationships is a system of empirical and theoretical relationships that relate 20 physicochemical properties of organic molecules to each other and to chemical structure. Melting point is a key parameter in the unified physicochemical property estimation relationships scheme because it is a determinant of several other properties including vapor pressure, and solubility. This review describes the first-principals calculation of the melting points of organic compounds from structure. The calculation is based on the fact that the melting point,  $T_m$ , is equal to the ratio of the heat of melting,  $\Delta H_m$ , to the entropy of melting,  $\Delta S_m$ . The heat of melting is shown to be an additive constitutive property. However, the entropy of melting is not entirely group additive. It is primarily dependent on molecular geometry, including parameters which reflect the degree of restriction of molecular motion in the crystal to that of the liquid. Symmetry, eccentricity, chirality, flexibility, and hydrogen bonding, each affect molecular freedom in different ways and thus make different contributions to the total entropy of fusion. The relationships of these entropy determining parameters to chemical structure are used to develop a reasonably accurate means of predicting the melting points over 2000 compounds.